Forecasting British Columbia Herring Stocks, 1973-1981

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ABSTRACT

Hourston, A. S. 1981. Forecasting British Columbia herring stocks, 1973-1981. Can. Tech. Rep. Fish. Aquat. Sci. 1047: iv + 43 p.

In the early 1970s, the development of a roe fishery on British Columbia herring created a need on the part of fishery managers for forecasts of abundance for 10-20 virtually instantaneous fisheries on geographically segregated spawning grounds. This required the redefinition of "stocks" in this context (management units), the upgrading and extension of the annual data base and the development of more quantitative analytical procedures for stock assessment and forecasting. Although forecasts of the runs to major management units have been provided since 1974 (F3), this process was not completed until 1981. The runs since 1974 were then reforecasted using current analytical procedures and newly developed parameters (F2) and the process repeated using the entire time series of the data base to correspond with the status of the present forecast (F1). The results indicate F1 to be of superior predictive value, but only marginally over F2. Forecasts by all three methods followed abundance trends quite well for the coast as a whole but were of less predictive value for smaller geographic units.

Key words: Clupea harengus pallasi, Pacific herring, forecasts, abundance

ERRATA

Hourston, A. S. 1981. Forecasting British Columbia herring stocks, 1973-1981. Can. Tech. Rep. Fish. Aquat. Sci. 1047: iv + 43 p.

p. 3 line 12: Table 2 should be Table 1.

p. 5 line 12: Fig. 2 should be Fig. 4.

P. 24 Table 2: Tables 2-7 should be Tables 3-9.

Tables 4-9: Table 1 in caption should be Table 2.

RÉSUMÉ

Hourston, A. S. 1981. Forecasting British Columbia herring stocks, 1973-1981. Can. Tech. Rep. Fish. Aquat. Sci. 1047: iv + 43 p.

Au début des années soixante-dix, suite au développement d'une pêche au hareng plein en Colombie-Britannique, les gestionnaires des pêches ont senti le besoin de faire des prévisions d'abondance pour dix à vingt pêches pratiquement instantanées qui s'effectuent sur des frayères isolées géographiquement. Pour cela, il a été nécessaire de redéfinir les "stocks" dans le contexte des unités d'aménagement, d'améliorer et d'accroître la base annuelle des données, et de mettre au point un plus grand nombre de méthodes d'analyses quantitatives afin d'évaluer et de prévoir les stocks. Bien que les prévisions des migrations de fraie aux principales unités de gestion aient été faites depuis 1974 (F3), cette opération n'a pas été terminée avant 1981. On a alors fait de nouvelles prévisions pour les migrations de fraie effectuées depuis 1974 en utilisant les méthodes d'analyse actuelle et de tout nouveaux paramètres (F2) et l'opération a été reprise en utilisant la série chronologique complète de la base des données pour qu'ils correspondent à la prévision actuelle (F1). Les résultats indiquent que F1 est plus valable que F2, mais de très peu seulement, pour prédire les retours. Les prévisions faites par les trois méthodes ont suivi assez bien les tendances d'abondance pour la côte dans son ensemble mais se sont révélées moins justes en ce qui concerne les unités géographiques plus petites.

Motes-clés: Clupea harengus pallasi, hareng du Pacifique, prévisions, abondance.

INTRODUCTION

In the early 70's, the development of a series of virtually instantaneous, geographically segregated, roe fisheries as the major means of harvesting British Columbia herring resulted in the need for quantitative forecasts for each of these fisheries. To meet this need, stocks were re-defined in terms of the biological entities supporting each of these fisheries (Hourston and Hamer 1979) and a computer analysis developed to assess the abundance of these stocks from catch, spawn deposition and sampling data (Hourston and Schweigert 1981). Meanwhile, the data base was improved by standardizing the sampling procedures (Hourston and Miller 1980) and reviewing and redesigning the sampling strategy (Humphreys and Hourston 1978b), and by developing new techniques for estimating the density of egg depositions (Humphreys and Hourston 1978a) and for estimating the numbers of eggs in each spawning (Haegele et al 1979a). At the same time, annual monitoring programs of the catch, spawning and sampling (e.g. Hourston 1980c, 1981c and 1980d, respectively) were gradually expanded to provide an increasingly comprehensive data base (Hourston 1981a, b).

Parallel to the development of this stock assessment analysis was the development of a forecasting procedure (Hourston and Schweigert 1981). The latter involved applying previously estimated annual survival rates at age (Tester 1955) to the numbers of fish in each cohort (Hourston 1981a) to estimate the number of adults which would return in the following year. The numbers of new recruits (age III and under) were then estimated on the basis of the average for the previous years in the time series for that stock and added to the numbers of adults to give forecast abundance in the upcoming year (e.g. Hourston 1979a).

This forecasting analysis involves two basic assumptions. Firstly, the adults return to the same management unit in which they spawned in the previous year, or immigration balances emigration. Secondly, all age III and younger fish are new recruits whereas all age IV and older fish are repeat spawners, or the amount of age III and younger fish which had spawned previously balances the amount of age IV and older fish which were spawning for the first time. Neither of these assumptions are likely to be met for management units (Hourston 1981d and 1981a, respectively). The degree to which they are not met, and the effects of this on abundance as forecast, is a matter for pre- and in-season interpretation for individual stocks.

The analysis also estimates abundance for good and poor recruitment (upper and lower 25 percent, respectively, of the values for the same time series). Given the resulting age composition and historical averages of fecundity and sex ratio at age, the numbers of fish required to provide a target egg deposition (required escapement) can be estimated and deducted from the forecast of the abundance of the run to give the potential catch. The numbers of fish in all categories are then converted into short tons (2000 lb) by multiplying by the historical average weight at age for the time series for that stock to provide the data in the units used by fisheries managers (e.g. Table 1). Test fishing immediately prior to the roe fishery would provide samples of the age composition to indicate whether recruitment was good, average or poor and hence which estimates of stock size and available catch was most appropriate.

Forecasts of runs to the major herring roe fisheries were initiated with the 1974 run. Because both the data base and the analytical procedures were in the early stages of development, forecasts were initially provided on an "in-house" basis only. After the first two years, development of both the

stock assessment and forecast analyses was held back when the computer facility at the Pacific Biological Station was upgraded and all of the programs had to be converted to the new machine. At the same time, programmers familiar with the analysis were pre-empted to higher priority projects, exacerbating the situation. Consequently it was not until the 1978 season that developments in the stock assessment analysis were incorporated and the 1979 forecasts were the first produced by computer. At this stage, confidence in the forecasts was sufficient to warrent "going public" and forecasts have been published since 1978 (Hourston and Humphreys 1978; Hourston 1979a, 1979b, and 1980a).

The new procedures developed for assessing spawning intensity (Humphreys and Hourston 1978a), the new procedure for estimating eggs per unit area (Haegele et al 1979a) and diver surveys of major spawning grounds (Haegele 1981) were put into practice in 1980, along with new, more reliable, stock specific fecundity estimates (Hourston et al 1981b) and coast-wide sampling from chartered test fishing vessels. Consequently, it was not until the 1981 forecast that a fully developed data base and the completed stock assessment and forecasting analysis became operative. Concurrently, an analysis of historical data on the timing of spawnings by section within management units (Hourston 1980b) and the publication of weekly catch and age compositions and maturity data (Hourston 1981b) provided a better basis for in-season interpretations of the forecasts. With the attainment of these milestones, a review and analysis of the forecasting of herring runs over the past decade would appear to be in order.

METHODS

As indicated above, forecasting herring runs to management units during the 1970's was a makeshift process, involving the application of partially developed analytical procedures to a data base whose format was only partially developed, and whose content was frequently incomplete and sometimes inaccurate. Thus the success (or lack thereof) of these forecasts (F3), while of historic interest, can hardly be considered a test of the present methodology.

While nothing can be done at this late date to plug the holes in the data base, it is now possible to go back and reforecast for the past decade, using analytical procedures at their current, much more advanced stage of development (including newly developed parameters) on a data base which has been checked for errors and omissions against alternative, independent data sources. Moreover, a series of site specific, ad hoc investigations has made possible more realistic quantitative interpretations of the rather qualitative spawn deposition data for different types of spawning grounds and of the spawning requirements for individual stocks. This second series of forecasts (F2) represents what could have been produced during this period had the above information been acquired in advance.

Another weakness in the data base over most of this period is the lack of a time series of sufficient duration to provide reliable estimates of such parameters as average, good and poor recruitment. The inclusion of the time series of data available to the present should further enhance the reliability of the forecasts and would parallel the present situation for forecasting. A third series of forecasts (F1) was, therefore, undertaken on this basis.

These three sets of forecasts were then compared with the stock assessments made from catch and spawn deposition. The relative importance of adults which had spawned previously and of new recruits in forecasting stock abundance and the effects of good and poor recruitment on the forecasts was examined using data from the most reliable series of forecasts. Finally, the predictive value of the forecasts was examined for different management units and divisions and for the coast as a whole.

RESULTS AND DISCUSSION

Forecasts from each of the three series were tabulated along with forecasts for high and low recruitment, the adult and recruit portions of the run, required spawners and direct assessments of the run from the most reliable analysis (Table 2). These data were arrayed by year for each of the 6 divisions (Table 3) and for the management units within each of the 6 divisions (Tables 4-9).

FORECASTING SYSTEMS

In comparing the 3 sets of forecasts with the population estimates, the Gulf of Georgia and West Coast of Vancouver Island divisions, which accounted for about two-thirds of the total run in recent years (Hourston 1981a) were selected for initial examination. These two divisions contain four of the largest and best documented management units over this period (Nanaimo-Comox, West Barkley, South Clayoquot, and Nuchatlitz). These four management units, in turn, supplied about two-thirds of the runs to the two major divisions over the study period and accounted for about half of the run to the coast as a whole. Moreover, recently developed diver surveys and spawning ground mapping techniques have been applied in these management units for two or more of the most recent years (Humphreys and Haegele 1976; Haegele and Humphreys 1977; Haegele and Miller 1979a, b; Haegele et al 1979b; and Haegele 1981), providing a more reliable data base for both stock assessments and forecasts (Hourston and Schweigert 1981).

Forecasts by the computer analysis (F1 and F2 in Fig. 3) were consistently closer to subsequent stock assessments in the Gulf of Georgia division and the main management unit (Nanaimo-Comox) within that division than were the more qualitative forecasts issued prior to the fishery (F3). In the three major management units from the West Coast of Vancouver Island division, there was little to choose among the forecasting systems. The computer forecasts appear to have been superior for the largest (South Clayoquot) management unit, where trends in abundance were fairly well indicated by all three forecasting systems. On the other hand, the computer forecasts failed to indicate the main peak in abundance in the West Barkley management unit in 1976 and 1977 (because of the unusually late recruitment of the 1972 and 1973 year-classes, Hourston 1981a) and all three systems were equally ineffective in forecasting the relatively minor fluctuations in

abundance in the Nuchatlitz management unit. In spite of the above, the more qualitative initial forecasts approximated abundance levels (P) for the division as a whole much more closely than did either of the computer forecasts. This largely fortuitous circumstance resulted from the balancing effect of gross overestimates in the initial forecasts for the smaller, poorly monitored stocks between 1975 and 1978 and consistent underestimates by all three forecasting systems for the major management units (Table 9). Moreover, the fecundity estimates used to calculate the tons of spawners from egg depositions for the initial forecasts were smaller (Nagasaki 1958) than those adopted in 1981 (Hourston et al 1981a) and used in both of the computer forecasts and in the stock assessments for the entire period, creating an additional upward bias in the initial forecasts. It would appear, therefore, that the computer forecasts provide a more representative measure of our ability to forecast herring runs in British Columbia than did the procedures employed in the initial forecasts prior to 1979. This advantage is much more apparent for the smaller, less well documented management units (Tables 4-9).

The anticipated advantage of using parameters for average recruitment and weight-at-age for the entire 10-year period in the computer forecasts (F1) over parameters estimates from the data base available prior to each year's fishery (F2) was not apparent for the major management units and divisions as differences between these two sets of forecasts were quite small (Fig. 1). During the period of peak abundance (1975-1978), forecasts from the F2 series were naturally higher than those from the F1 series so that whenever the forecasts underestimated the stock, the F2 forecasts were slightly closer to the stock assessments (e.g. West Coast of Vancouver Island), and vice-versa (e.g. Gulf of Georgia). This generalization also applies to the other management units and divisions (Tables 4-9). Since abundance was relatively low in most of the management units and divisions in the earlier years when the differences between these two forecasts were usually greatest, the F1 forecasts were considered to most closely resemble actual abundance over the nine-year period under consideration. On this basis the results from this forecasting system were used in further examinations of the relationships between forecasts and actual abundance.

GENERAL FEATURES OF FORECASTS

Forecasts follow the general trends in abundance quite well for the coast as a whole (Fig. 4) but are of less predictive value for smaller geographic units (divisions and management units - Fig. 5). Presumably this reflects the variability in recruitment to these smaller units and/or immigration to and emigration from the individual units. The former problem can be overcome by incorporating assessments of the strength of the incoming year-class into the forecasting analysis. This has already been accomplished to a limited extent by providing alternative estimates of abundance for good and poor recruitment (Table 1) so that gross adjustments can be made in the forecasts on the spot by test fishing to sample for age composition immediately prior to the commercial fishery. While most of the repeat spawners are thought to "home" to their previous spawning grounds, some immigration and emigration occurs, even over large distances (Stevenson 1955). The extent to which such straying may be taken into account in the forecasting system depends upon the re-analysis of past tagging data

(Hourston, 1981d) and the results of current tagging and related studies.

Shifts in the abundance of individual "stocks" do not generally show up in the forecasts until the following year (Fig. 5). This time lag is most evident at the smallest (management unit) "stock" level, is still pronounced at the division level, but is much less apparent for the coast as a whole (Fig. 4). This suggests that immigration and emigration play a more important role in determining abundance in the smaller geographic units than does variation in recruitment or else that pre-recruitment survival rates vary appreciably between management units (and divisions) and that these differences tend to balance one another for the coast as a whole. Since, on the average, recruitment accounts for only half of the desired spawning escapement (Fig. 2), it would appear that immigration and emigration play the dominant role in determining the abundance of individual stocks.

On the other hand, recruitment is highly variable. Forecasts under good recruitment were 50 to 100% higher than forecasts under poor recruitment for the coast as a whole (Fig. 4), and the range was much greater for divisions and management units (Tables 4-9). Moreover, the difference in tonnage between good and poor recruitment in any one year (about 180,000 tons) was higher than the range in the tonnage of adults (F1 - R in Fig. 4) over the 9-year period (125,000 tons). On this basis it would appear that, contrary to indications cited in the previous paragraph, variations in recruitment have a greater impact on forecasts of abundance than do immigration and emigration. In any event it would appear that any successful forecasting system would have to take both of these features fully into account.

The minor variations in estimates of average recruitment and required spawners (R and S, respectively, in Fig. 4) reflect the inclusion or exclusion of minor elements of the run to the coast according to the availability of monitoring data for that year.

DIVISIONS AND MANAGEMENT UNITS

Except for the tendency noted above for forecasts to be a year late in detecting changes in abundance trends, forecasts for all 6 divisions and the 14 major management units approximated abundance levels and changes therein rather well in most instances (Fig. 5). Forecasts consistently tended to underestimate abundance in the 3 more northerly divisions and the West Coast of Vancouver Island division, and in each of the 10 major management units from these divisions. On the other hand, forecasts for the Johnstone Strait and Strait of Georgia divisions were, on the average, very close to the actual abundance levels as were the forecasts for the 4 management units within these divisions. The difference between these two groups can be traced to the method of calculating recruits. The Gulf of Georgia division is the only one for which age III and younger fish usually make up a majority of the run (Hourston and Schweigert 1980). Consequently, the method employed in the forecasts would underestimate recruitment to the other stocks and hence underestimate the total run to each of these regions. This conclusion is supported by the fact that it is during peak periods of abundance, when recruitment is relatively high, that the forecasts for the management units underestimate the runs to the greatest extent (Fig. 3). By applying mathematical models to the current data base, it should be possible to develop better estimates of recruitment to these management units and divisions and

hence overcome this problem in the near future.

The anomaly that forecasts for the management units in the Johnstone Strait division did not underestimate the runs as in the other divisions is probably an artifact of the poor data base for Johnstone Strait. The lack of a roe fishery there during the past 5 years, and practical difficulties in obtaining samples from the small, earlier, roe fisheries resulted in age composition data for this division being derived mainly from other sources. These include samples from commercial fisheries farther to the south or from research and test fishing samples taken prior to the roe fishery. In either case, these samples may have come largely from schools in transit to the Gulf of Georgia. Consequently, age compositions for Johnstone Strait stocks prior to 1981 probably reflect conditions in the Gulf of Georgia rather than locally. The introduction of test fishing during the spawning season in 1981 provides a means of overcoming this deficiency in the future.

ACKNOWLEDGEMENTS

The help of various members of the Herring section staff, past and present, in the development of the forecasting system and the preparation of this report is gratefully acknowledged. The analysis was programmed for computer processing by Marc Hamer. Vivian Haist processed the data by computer and modified the analysis. R. D. Humphreys contributed to the estimates of spawning requirements and commented on field conditions which might affect the data. Fay Winters compiled the tables and Doug Miller prepared the figures.

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FIGURES AND TABLES

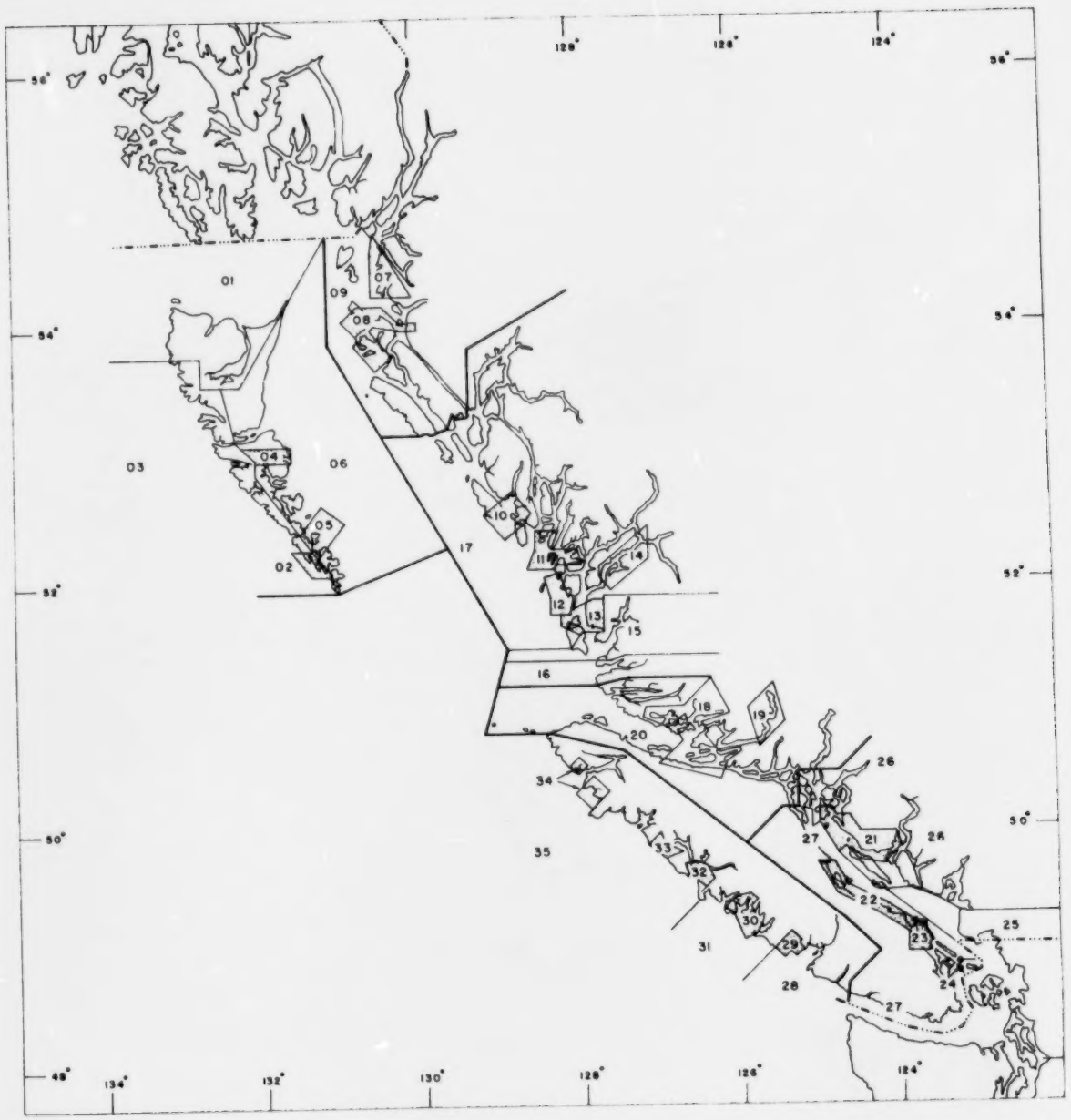

Fig. 1. Herring management units in British Columbia.

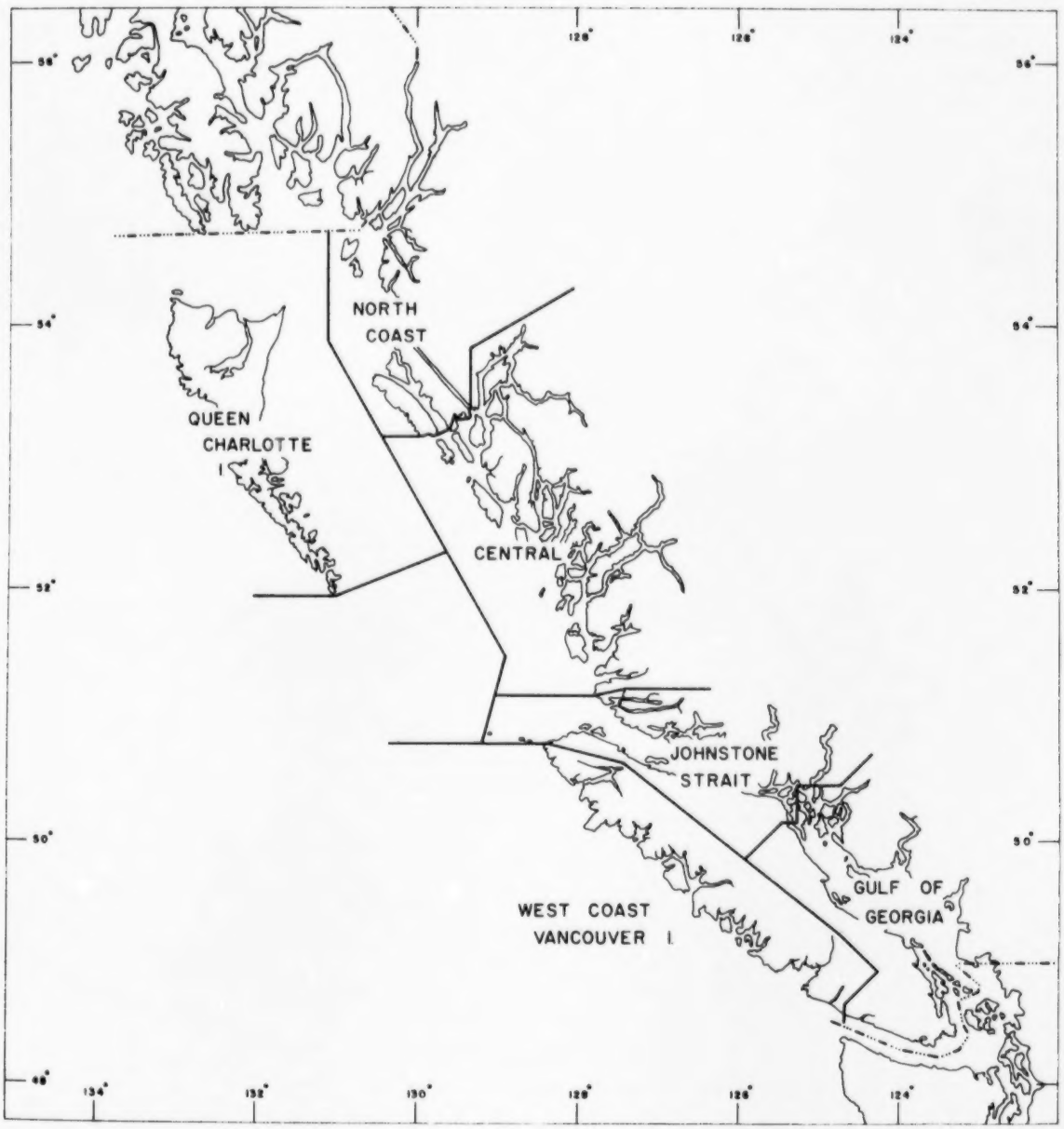

Fig. 2. Herring divisions in British Columbia.

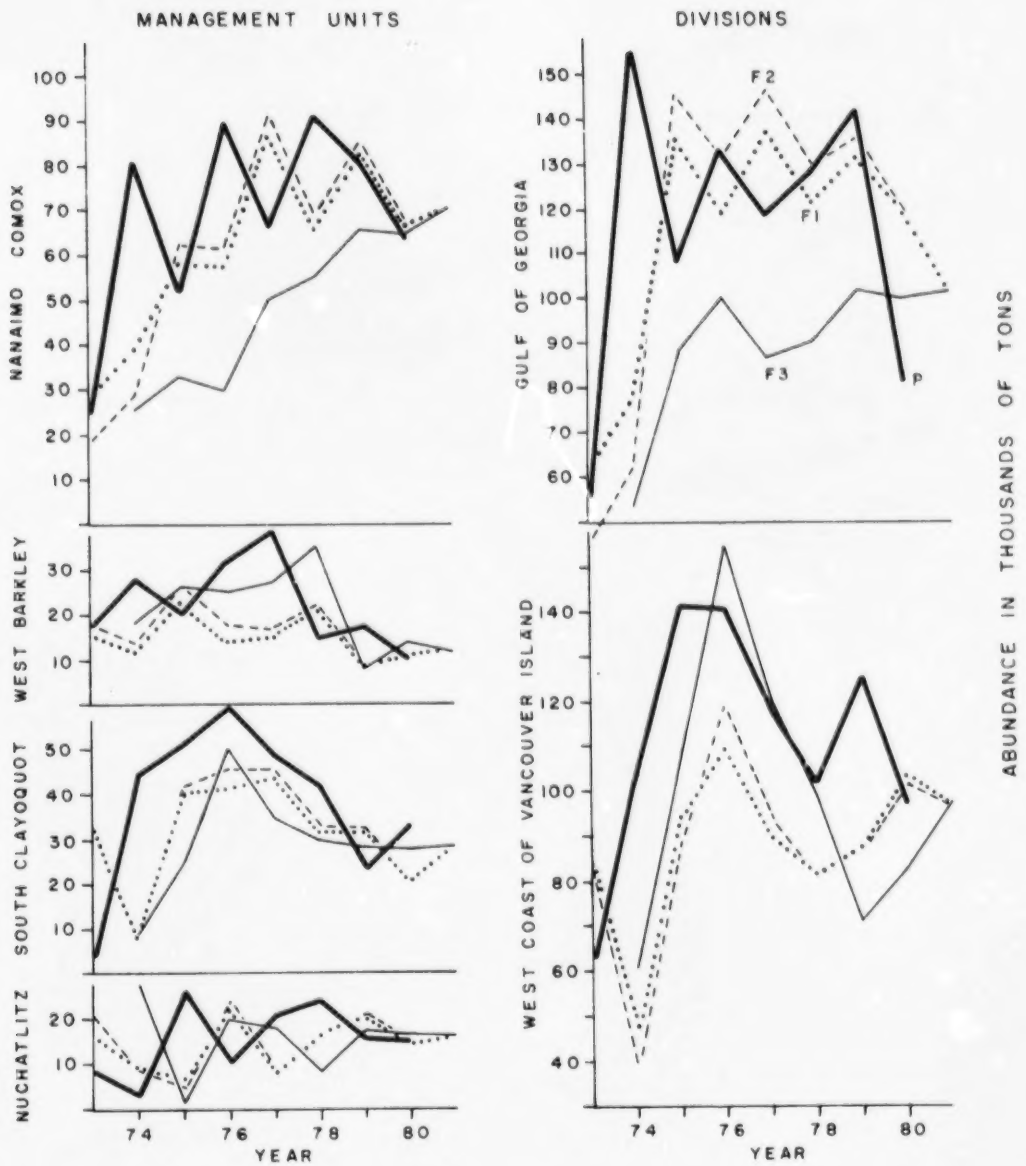

Fig. 3. Stock assessments (P) and forecasts by computer analysis using time series data to 1981 (F1), by computer analysis using time series data available prior to the current year (F2), and as prepared from analysis developed to date for each year (F3) for the Gulf of Georgia and West Coast of Vancouver Island divisions and their major management units.

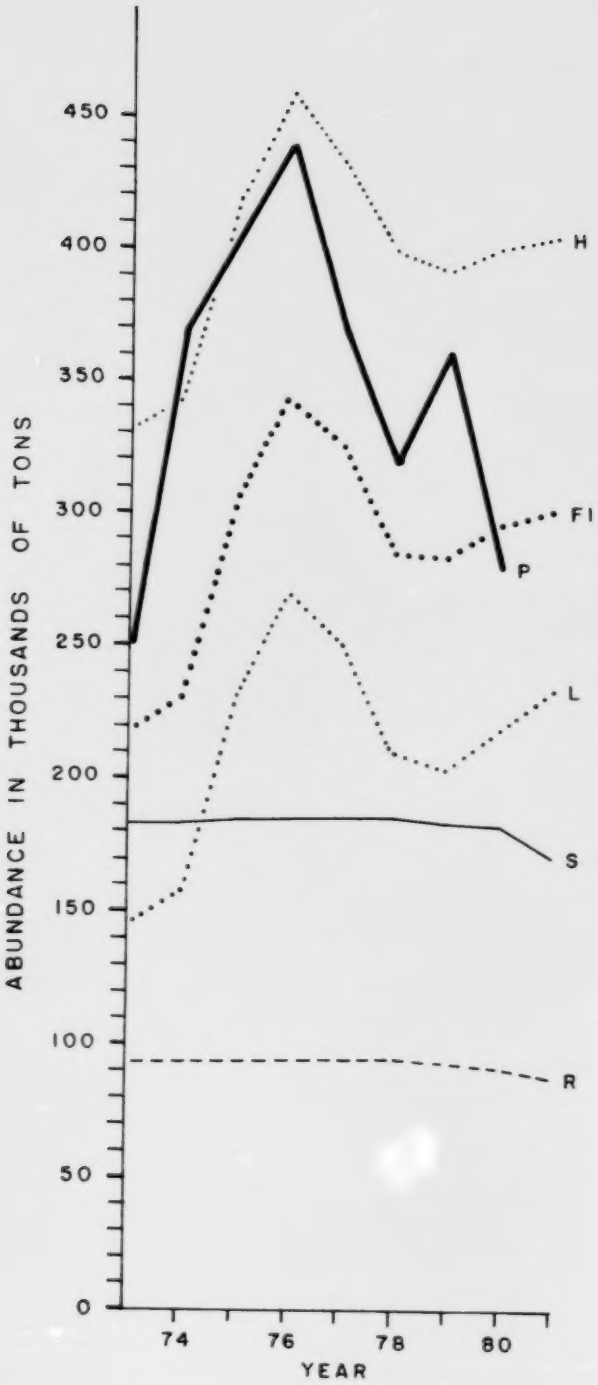

Fig. 4. Stock assessments (P), best forecasts with high (H), average (Fl) and low (L) recruitment, spawners required (S) and average recruitment (R) for the British Columbia coast as a whole.

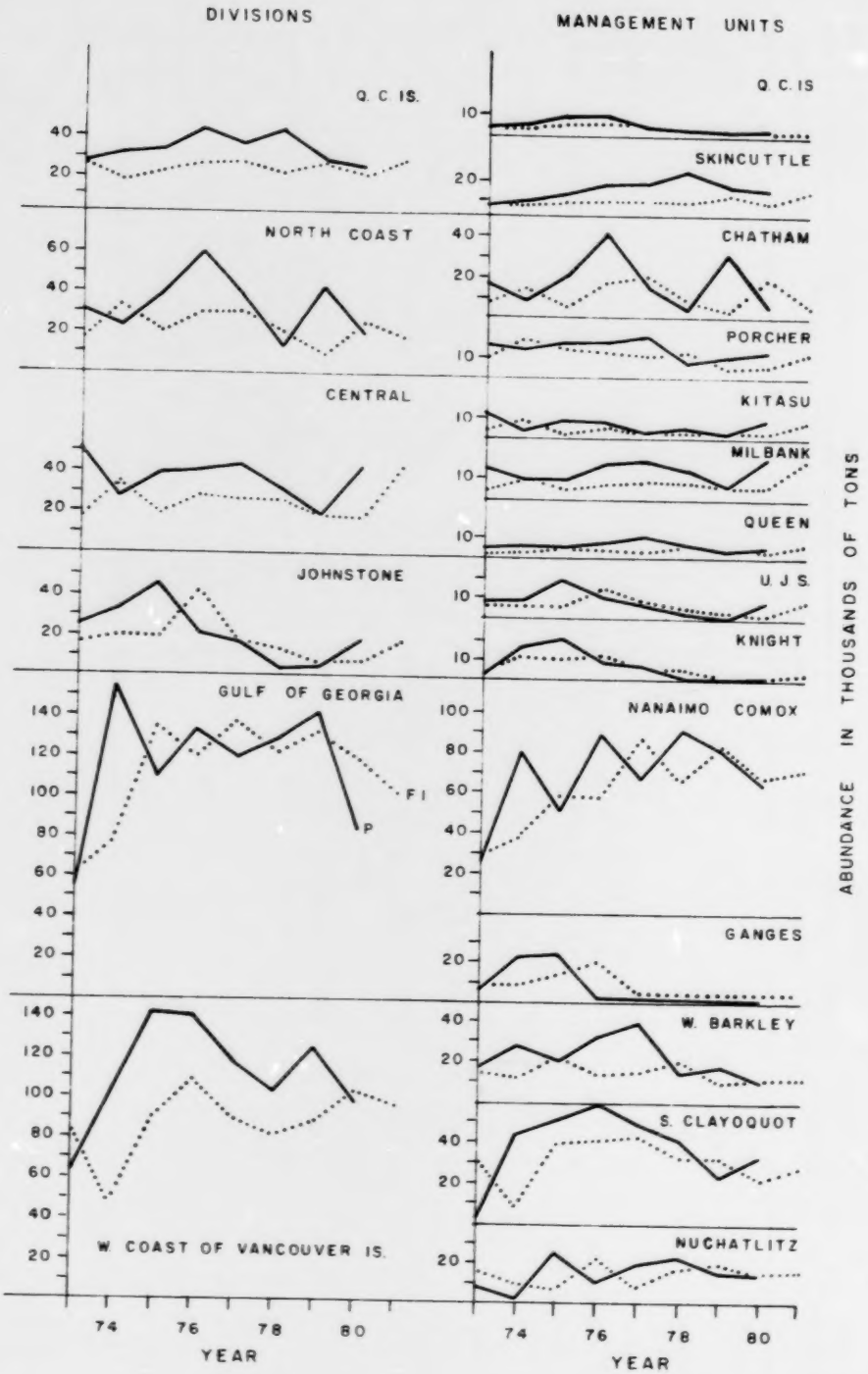

Fig. 5. Stock assessments (P) and best forecasts (F1) for the 6 divisions and 14 major management units on the British Columbia coast.

Table 1. Forecast of the 1981 runs and available catch in tons of fish by management unit for good, average and poor recruitment.

Division and Management Unit	Adults	Recruits			Run			Spawners required	Available catch		
		Poor	Average	Good	Poor	Average	Good		Poor	Average	Good
Queen Charlotte Is.											
North Coast	3561	365	1398	3896	3925	4959	7457	3000	925	1959	4457
Louscoone Inlet	863	196	714	1677	1059	1577	2540	4000	0	0	0
Other Area 2W	2498	155	618	1569	2653	3117	4067	1500	1153	1617	2567
Skincuttle Inlet	27913	828	4355	11496	28741	32268	39409	7000	21741	25268	32409
Other Area 2E	1705	347	946	2019	2052	2651	3724	1500	552	1151	2224
All	36541	1891	8031	20657	38432	44571	57197	17000	24372	29994	41657
North Coast											
Chatham Sound	3801	144	2364	6167	3945	6165	9967	10000	0	0	0
Porcher Is.	9240	300	2673	7975	9540	11913	17215	10000	0	1913	7215
Other North Coast	418	2	85	290	420	503	708	100	320	403	608
All	13459	446	5121	14431	13905	18580	27890	20100	320	2316	7822
Central											
Kitasu Bay	7401	104	1348	3972	7506	8750	11374	3000	4506	5750	8374
Milbanke Sound	16491	790	2634	6805	17281	19124	23296	8000	9281	11124	15296
Queens Sound	4816	525	1255	2764	5341	6072	7581	4000	1341	2072	3581
Kwakshua Channel	1699	61	1080	3723	1760	2779	5422	2000	0	779	3422
Rivers Inlet	478	73	629	1737	550	1106	2214	1500	0	0	714
Smith Inlet	1583	10	348	1027	1593	1931	2610	500	1093	1431	2110
Other Central	2993	44	737	2282	3037	3730	5275	400	2637	3330	4875
All	35461	1607	8032	22311	37068	43493	57772	19400	18858	24486	38372

Table 1 (cont'd)

Division and Management Unit	Adults	Recruits			Run			Spawners required	Available catch		
		Poor	Average	Good	Poor	Average	Good		Poor	Average	Good
Johnstone Strait											
Upper Johnstone Strait	6650	160	1837	4875	6810	8487	11525	4000	2810	4487	7525
Knight Inlet	890	75	918	2525	966	1809	3415	5000	0	0	0
Other Johnstone Strait	5980	339	1610	4069	6319	7590	10048	1200	5119	6390	8848
All	13520	575	4366	11468	14095	17886	24989	10200	7930	10877	16373
Gulf of Georgia											
Powell River	4141	2456	5538	11304	6597	9679	15445	10000	0	0	5445
Nanaimo-Comox	47255	7333	23456	49166	54588	70711	96421	30000	24588	40711	66421
Yellow Point	6704	835	6116	16675	7539	12820	23379	10000	0	2820	13379
Ganges-Plumper	433	251	4330	13373	684	4762	13806	3000	0	1762	10806
Other Gulf Mainland	1211	8	450	1770	1219	1661	2981	300	919	1361	2681
Other Gulf Vancouver Is.	809	76	676	1889	885	1485	2698	800	85	685	1898
All	60552	10959	40565	94177	71511	101117	154729	54100	25592	47338	100629
West Coast Vancouver Is.											
West Barkley	6376	1215	5307	12366	7591	11683	18742	15000	0	0	3742
South Clayoquot	20934	1642	7190	17565	22576	28124	38499	20000	2576	8124	18499
Other Area 24	2201	264	1335	3402	2465	3536	5603	2000	465	1536	3603
Nuchatlitz Inlet	11135	1314	4798	12501	12448	15932	23636	10000	2448	5932	13636
Quatsino Sound	32866	40	4533	14906	32906	37399	47772	3000	29906	34399	44772
All	73511	4475	23164	60740	77986	96675	134251	50000	35395	49992	84251
ALL DIVISIONS	233044	19953	89278	223784	252997	322323	456828	170800	112468	165004	289105

Table 2. Codes for herring forecast data in Tables 2-7. All units are in short tons (2000 lb). All calculations utilized the full ten year data base unless otherwise noted.

S - Spawners required.

L - Population forecast with low recruitment.

H - Population forecast with high recruitment.

A - Adults (fish which have spawned at least once before).

R - Recruits (first-time spawners).

F1 - Population forecast with average recruitment.

F2 - Population forecast with average recruitment using recruitment and weight data available prior to the fishery for that year.

F3 - Population forecast issued prior to the fishery for that year using analysis at the current stage of development.

P - Population estimate from catch and spawning escapement.

Table 3. Herring forecast data (tons) by division for British Columbia 1973-1981. (See Table 2 for data codes.)

Division	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
Queen Charlotte Is.	S	18000	18000	21000	21000	21000	21000	21000	21000	17000
	L	20099	11847	14468	18101	19551	14610	18065	12244	19814
	H	31688	23435	28530	32163	33612	28671	32126	23606	30577
	A	18454	10201	12459	16091	17541	12600	16055	10234	17922
	R	6204	6204	7602	7602	7602	7602	7602	7602	6504
	F1	24658	16406	20061	23693	25143	20202	23657	17837	24426
	F2	25678	17620	21965	24574	25495	19974	23324	16760	24426
	F3	-	31000	34300	32500	45000	45000	23935	15971	24427
	P	25192	29903	31825	41855	34745	40181	27347	23806	-
North Coast	S	20100	20000	20100	20100	20000	20100	20100	20000	20100
	L	11309	30698	15660	25426	26817	16240	4800	22029	13905
	H	24048	43158	28399	38166	39277	28980	17540	34489	26645
	A	10863	30254	15214	24980	26373	15794	4354	21585	13459
	R	5121	5037	5121	5121	5037	5121	5121	5037	5121
	F1	15984	35291	20335	30102	31410	20916	9476	26622	18580
	F2	13350	34506	21298	28961	30313	20076	8290	25741	18580
	F3	-	47500	22600	25000	33000	40000	7280	21692	18581
	P	31729	23115	39215	60750	38366	13296	43154	18255	-
Central	S	21400	21400	21400	21400	21400	21400	19400	21400	19400
	L	9865	27888	13421	22055	19497	19702	12662	10766	37068
	H	28913	46936	32469	41103	38545	38750	31116	29814	55522
	A	8040	26043	11597	20230	17672	17878	11055	8941	35461
	R	8548	8548	8548	8548	8548	8548	8032	8548	8032
	F1	16588	34611	20144	28778	26219	26425	19087	17489	43493
	F2	15108	36904	20435	29001	25444	25323	17652	15521	43493
	F3	-	61100	25600	43300	-	42700	17240	13662	43492
	P	52570	27350	38741	41133	42975	32326	19293	43610	-

Table 3 (cont'd)

Division	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
Johnstone Strait	S	10200	10200	10200	10200	10200	10200	10200	10200	10200
	L	12183	15953	15415	29310	12854	9893	3473	3339	14095
	H	21570	25339	24801	38696	22240	19279	12859	12725	23482
	A	11608	15378	14840	28795	12279	9317	2897	2764	13520
	R	4366	4366	4366	4366	4366	4366	4366	4366	4366
	F1	15974	19743	19205	33100	16645	13683	7263	7129	17886
	F2	16079	17993	18281	33657	16757	14118	7110	6631	17886
	F3	-	28000	9000	32100	35000	11600	5098	5005	17886
	P	25333	30335	45422	21847	16550	4202	4583	17764	-
Gulf of Georgia	S	55600	55600	55600	55600	55600	55600	55600	53800	54100
	L	29314	46404	103856	87566	106357	90518	100155	89980	71511
	H	104490	121582	179031	162742	181353	165693	175330	158689	141877
	A	18305	35397	92846	76557	95348	79509	89145	79029	60552
	R	42118	42118	42118	42118	42118	42118	42118	40116	40565
	F1	60422	77514	134964	118674	137466	121626	131263	119144	101117
	F2	45339	62490	145630	131160	146183	129839	136089	121094	101117
	F3	-	53100	88000	100000	87000	90500	111879	99902	101118
	P	53910	154609	108147	133479	118977	128212	141557	81887	-
West Coast Vancouver Island	S	58000	58000	57000	58000	58000	58000	58000	57000	50000
	L	62382	25296	66949	86953	68046	59545	65667	81971	77986
	H	120475	83388	124306	145046	126138	117637	123759	138963	127421
	A	57608	20522	62187	82179	63272	54770	60893	77226	73511
	R	27024	27024	26637	27024	27024	27024	27024	26478	23164
	F1	84632	47546	88824	109204	90296	81795	87917	103704	96675
	F2	82830	39743	88161	118226	92331	80797	87344	101271	96675
	F3	-	60500	109000	155000	120000	99000	72664	83037	97206
	P	62625	102434	141198	140461	117607	102611	125181	97127	-

Table 3 (cont'd)

Division	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
ALL DIVISIONS	S	183300	183200	185300	186300	186200	186300	184300	183400	170800
	L	145153	158088	229769	269412	253122	210508	204822	220329	234379
	H	331183	343838	417537	457915	441346	399010	392730	400986	405522
	A	124878	137815	209142	248772	232485	189868	184400	199780	214426
	R	93381	93296	94391	94779	94694	94779	94263	92146	87751
	F1	218259	231111	303533	343551	327179	284647	278663	291925	302178
	F2	198385	209255	315770	366479	336523	290127	279809	287018	302178
	F3	-	281200	297500	387900	391000	328800	238096	239269	302710
	P	251359	367747	404548	439525	369041	320828	361115	282449	-

Table 4. Herring forecast data (tons) for management units in the Queen Charlotte Islands Division, 1973-81. (See Table 1 for data codes.)

Management Unit	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
01 North Coast	S	-	-	3000	3000	3000	3000	3000	3000	3000
	L	-	-	365	1754	4533	2807	3844	1455	3925
	H	-	-	2838	4227	7006	5280	6317	3928	6398
	A	-	-	0	1389	4169	2442	3480	1090	3561
	R	-	-	1398	1398	1398	1398	1398	1398	1398
	F1	-	-	1398	2787	5567	3840	4878	2488	4959
	F2	-	-	2116	2884	5937	3906	4827	2281	4959
	F3	-	-	-	b	b	b	5545	2183	4959
	P	-	4947	2045	4961	3499	6283	1855	3997	-
02 Louscoone Inlet	S	4000	4000	4000	4000	4000	4000	4000	4000	4000
	L	2126	2890	3909	5008	3841	642	544	975	1059
	H	3341	4105	5125	6223	5057	1858	1760	2191	2275
	A	1930	2693	3713	4811	3645	446	348	779	863
	R	714	714	714	714	714	714	714	714	714
	F1	2644	3407	4427	5525	4359	1160	1062	1493	1577
	F2	2755	3915	4814	5770	4527	1262	1105	1459	1577
	F3	-	a	4800	8000	8000	7000	1191	2057	1577
	P	3644	5090	9360	9710	3752	3129	1358	2298	-
03 Other Area 2W	S	1500	1500	1500	1500	1500	1500	1500	1500	1500
	L	1703	1591	2307	1233	687	1833	796	1351	2653
	H	2861	2749	3465	2391	1846	2991	1954	2509	3812
	A	1548	1463	2151	1078	532	1677	640	1196	2498
	R	618	618	618	618	618	618	618	618	618
	F1	2166	2054	2770	1696	1151	2296	1259	1814	3117
	F2	1972	1825	2678	1719	1080	2178	1104	1654	3117
	F3	-	3000	3500	2500	b	b	b	2083	3117
	P	3309	3684	2236	760	2661	1859	2705	3044	-

Table 4 (cont'd)

Management Unit	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
04 Cumshewa Inlet	S	4000	4000	4000	4000	4000	4000	4000	4000	-
	L	8649	3102	1463	1813	1314	2643	2758	2332	-
	H	11947	6400	4761	5112	4613	5942	6057	5631	-
	A	8530	2983	1344	1695	1195	2542	2639	2214	-
	R	1098	1098	1098	1098	1098	1098	1098	1098	-
	F1	9628	4082	2442	2793	2294	3623	3738	3312	-
	F2	10641	5518	3321	3377	2620	3877	3869	3312	-
	F3	-	a	5000	5000	6000	4000	3650	2928	-
	P	10507	6561	4515	4250	4849	4372	3780	-	-
05 Skincuttle Inlet	S	7000	7000	7000	7000	7000	7000	7000	7000	7000
	L	3707	2702	4885	5023	5212	4472	8319	4148	10123
	H	8277	7272	9454	9593	9782	9042	12889	8718	14693
	A	2879	1874	4056	4195	4384	3644	7491	3320	9295
	R	2828	2828	2828	2828	2828	2828	2828	2828	2828
	F1	5706	4702	6884	7022	7211	6472	10318	6147	12123
	F2	5288	4077	6774	6888	6717	5908	9982	5528	12123
	F3	-	25000	7000	10000	16000	20000	9872	5095	12123
	P	5578	7645	10089	16744	16740	22096	14526	12673	-
06 Other Area 2E	S	1500	1500	1500	1500	1500	1500	1500	1500	1500
	L	3914	1562	1541	3270	3963	2213	1803	1983	2052
	H	5261	2909	2887	4617	5309	3559	3150	3329	3399
	A	3568	1215	1194	2923	3616	1866	1456	1636	1705
	R	946	946	946	946	946	946	946	946	946
	F1	4514	2162	2140	3870	4562	2812	2403	2582	2651
	F2	5022	2284	2262	3936	4614	2844	2437	2525	2651
	F3	-	3000	14000	7000	15000	14000	3677	1625	2651
	P	2154	1976	3580	5430	3243	2444	3122	1974	-

Table 4 (cont'd)

Management Unit	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
ALL	S	18000	18000	21000	21000	21000	21000	21000	21000	17000
	L	20099	11847	14468	18101	19551	14610	18065	12244	19814
	H	31688	23435	28530	32163	33612	28671	32126	26306	30577
	A	18454	10201	12459	16091	17541	12600	16055	10234	17922
	R	6204	6204	7602	7602	7602	7602	7602	7602	6504
	F1	24658	16406	20061	23693	25143	20202	23657	17837	24426
	F2	25678	17620	21965	24574	25495	19974	23324	16760	24426
	F3	-	31000	343000	325000	45000	45000	23935	15971	24427
	P	25192	29903	31825	41855	34745	40181	27347	23806	-

[a]Included with Skincuttle Inlet.
[b]Included with Other Area 2E.

Table 5. Herring forecast data (tons) for management units in the North Coast Division, 1973-81 (see Table 1 for data codes).

Management Unit	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
07 Chatham Sound	S	10000	10000	10000	10000	10000	10000	10000	10000	10000
	L	4819	13265	3432	15018	18699	6032	1218	17760	3945
	H	9936	18382	8548	20135	23815	11148	6334	22877	9061
	A	4675	13121	3288	14874	18555	5888	1074	17616	3801
	R	2364	2364	2364	2364	2364	2364	2364	2364	2364
	F1	7039	15485	5652	17238	20919	8252	3438	19980	6165
	F2	6032	15503	5758	16835	19896	7816	2873	19857	6165
	F3	-	15500[a]	5500	13000	19000	18000	2045	6578	6165
	P	16530	7931	21114	42923	17335	5468	32322	5262	-
08 Porcher Island	S	10000	10000	10000	10000	10000	10000	10000	10000	10000
	L	6487	17433	12067	10333	8119	10151	3515	4269	9540
	H	13831	24777	19411	17677	15462	17494	10859	11613	16884
	A	6187	17133	11767	10033	7819	9851	3215	3969	9240
	R	2673	2673	2673	2673	2673	2673	2673	2673	2673
	F1	8860	19806	14440	12706	10491	12523	5888	6642	11913
	F2	7196	19003	15293	12887	10417	12151	5306	5884	11913
	F3	-	19000[a]	141000	11000	9000	20000	5166	15114	11913
	P.	15199	14910	17980	17827	20923	7690	10832	12552	-
09 Other North Coast	S	100	-	100	100	-	100	100	-	100
	L	2	-	161	75	-	58	67	-	420
	H	281	-	441	354	-	337	347	-	700
	A	0	-	159	73	-	56	65	-	418
	R	85	-	85	85	-	85	85	-	85
	F1	85	-	244	158	-	140	150	-	503
	F2	121	-	246	139	-	109	110	-	503
	F3	-	13500	3000	1000	5000	2000	68	-	503
	P	-	274	121	-	109	138	-	441	-

Table 5 (cont'd)

Management Unit	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
ALL	S	20100	20000	20100	20100	20000	20100	20100	20000	20100
	L	11309	30698	15660	25426	26817	16240	4800	22029	13905
	H	24048	43158	28399	38166	39277	28980	17540	34489	26645
	A	10863	30254	15214	24980	26373	15794	4354	21585	13459
	R	5121	5037	5121	5121	5037	5121	5121	5037	5121
	F1	15984	35291	20335	30102	31410	20916	9476	26622	18580
	F2	13350	34506	21298	28961	30313	20076	8290	25741	18580
	F3	-	47500	22600	25000	33000	40000	7280	21692	18581
	P	31729	23115	39215	60750	38366	13296	43154	18255	-

[a]20,000 tons for Area 4 outside divided evenly between Chatham Sound and Porcher Island.

Table 6. Herring forecast data (tons) for management units in the Central Coast Division, 1973-81 (see Table 1 for data codes).

Management Unit	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
10 Kitasu Bay	S	3000	3000	3000	3000	3000	3000	3000	3000	3000
	L	1980	8432	1131	3685	1372	1552	1525	1206	7506
	H	5502	11954	4653	7207	4894	5074	5047	4728	11027
	A	1876	8328	1027	3581	1268	1448	1421	1102	7401
	R	1348	1348	1348	1348	1348	1348	1348	1348	1348
	F1	3225	9676	2376	4929	2616	2796	2770	2451	8750
	F2	2768	10279	2518	4969	2462	2491	2379	1963	8750
	F3	-	14000	3000	7000	6000	5000	2486	1717	8750
	P	12794	3915	8278	4477	3413	5629	2152	8701	-
11 Milbanke Sound	S	8000	8000	8000	8000	8000	8000	8000	8000	8000
	L	2028	7672	2901	4523	6796	6598	4411	4037	17281
	H	7548	13192	8421	10042	12316	12118	9931	9556	22801
	A	1238	6882	2111	3732	6006	5808	3621	3246	16491
	R	2634	2634	2634	2634	2634	2634	2634	2634	2634
	F1	3872	9516	4744	6366	8640	8442	6255	5880	19124
	F2	2586	9515	4201	5654	7834	7561	5374	4853	19124
	F3	-	25000	4000	4000	19000	22000	5009	5007	19124
	P	15598	9275	9493	16752	18671	15028	6490	20961	-
12 Queens Sound	S	4000	4000	4000	4000	4000	4000	4000	4000	4000
	L	980	1419	4172	3442	2774	5554	3300	2306	5341
	H	2843	3282	6035	5305	4637	7417	5163	4169	7204
	A	455	894	3647	2917	2250	5029	2775	1782	4816
	R	1255	1255	1255	1255	1255	1255	1255	1255	1255
	F1	1711	2150	4903	4172	3505	6284	4030	3037	6072
	F2	1566	2355	5110	4244	3406	6231	3882	2795	6072
	F3	-	a	5000	4000	7400	6000	4465	2873	6072
	P	4631	5678	5500	7028	11115	6949	3817	5839	-

Table 6 (cont'd)

Management Unit	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
13 Kwakshua Channel	S	2000	2000	2000	2000	2000	2000	2000	2000	2000
	L	61	2614	1266	3206	3034	2147	1525	988	1760
	H	3150	5703	4355	6295	6123	5237	4614	4077	4849
	A	0	2553	1205	3145	2973	2087	1464	927	1699
	R	1080	1080	1080	1080	1080	1080	1080	1080	1080
	F1	1080	3633	2286	4225	4053	3167	2544	2007	2779
	F2	122	4035	2308	4693	4330	3390	2641	2040	2779
	F3	-	5000	1500	3000	[b]	2500	2507	1328	2779
	P	3517	2515	5836	4084	2683	2246	2137	2593	-
14 Burke Channel	S	2000	2000	2000	2000	2000	2000	-	2000	-
	L	1433	2389	1887	1573	3097	2031	-	1326	-
	H	2027	2983	2481	2167	3691	2625	-	1920	-
	A	1215	2171	1669	1355	2879	1813	-	1108	-
	R	516	516	516	516	516	516	-	516	-
	F1	1731	2687	2185	1871	3395	2329	-	1624	-
	F2	2264	2935	2245	1850	3172	2286	-	1624	-
	F3	-	6000	3000	3000	[b]	3000	-	763	-
	P	3906	2021	2066	4571	3634	-	2904	-	-
15 Rivers Inlet	S	1500	1500	1500	1500	1500	1500	1500	1500	1500
	L	725	3885	1344	4155	1112	1470	956	253	550
	H	2268	5428	2887	5698	2655	3013	2499	1796	2093
	A	652	3812	1272	4082	1039	1397	884	180	478
	R	629	629	629	629	629	629	629	629	629
	F1	1281	4441	1901	4711	1668	2026	1513	809	1106
	F2	859	4734	2130	4979	1938	2170	1625	856	1106
	F3	-	9000	1800	2000	[b]	2000	1352	790	1106
	P	9877	2789	5558	1755	2724	1456	447	382	-

Table 6 (cont'd)

Management Unit	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
16 Smith Inlet	S	500	500	500	500	500	500	500	500	500
	L	320	529	307	410	298	108	798	198	1593
	H	1218	1426	1205	1307	1195	1005	1695	1095	2491
	A	310	518	297	400	288	98	788	187	1583
	R	348	348	348	348	348	348	348	348	348
	F1	658	867	645	748	636	446	1136	536	1931
	F2	711	888	587	700	547	318	1053	431	1931
	F3	-	800	300	300	[b]	200	1013	461	1931
	P	956	609	687	458	168	780	416	1788	-
17 Other Central	S	400	400	400	400	400	400	400	400	400
	L	2338	948	412	1061	1013	242	146	453	3037
	H	4358	2967	2432	3081	3033	2262	2166	2472	5057
	A	2294	904	368	1018	969	198	102	409	2993
	R	737	737	737	737	737	737	737	737	737
	F1	3031	1641	1105	1754	1706	935	839	1146	3730
	F2	4233	2164	1337	1912	1755	876	699	959	3730
	F3	-	1300	7000	20000	35000	2000	407	652	3730
	P	1290	548	1322	2007	387	238	929	3346	-
ALL	S	21400	21400	21400	21400	21400	21400	19400	21400	19400
	L	9865	27888	13421	22055	19497	19702	12662	10766	37068
	H	28913	46936	32469	41103	38545	38750	31116	29814	55522
	A	8040	26043	11597	20230	17672	17878	11055	8941	35461
	R	8548	8548	8548	8548	8548	8548	8032	8548	8032
	F1	16588	34611	20144	28778	26219	26425	19087	17489	43493
	F2	15108	36904	20435	29001	25444	25323	17652	15521	43493
	F3	-	61100	25600	43300	-	42700	17240	13662	43492
	P	52570	27350	38741	41133	42975	32326	19293	43610	-

[a]Included with Milbanke Sound.
[b]Included with Other Central.

Table 7. Herring forecast data (tons) for management units in the JOHNSTONE STRAIT Division, 1973-81 (see Table 1 for data codes).

Management Unit	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
18 Upper Johnstone Strait	S	4000	4000	4000	4000	4000	4000	4000	4000	4000
	L	4155	4127	3938	13104	6722	4082	1718	253	6810
	H	8424	8397	8207	17374	10991	8351	5988	4522	11080
	A	3994	3967	3777	12944	6561	3921	1558	92	6650
	R	1837	1837	1837	1837	1837	1837	1837	1837	1837
	F1	5831	5804	5615	14781	8398	5759	3395	1930	8487
	F2	5247	5288	4876	15372	8574	5961	3272	1633	8487
	F3	-	6100	1500	3000	7000	5000	2112	1156	8487
	P	6967	8359	19402	10741	6271	2201	227	8403	-
19 Knight Inlet	S	5000	5000	5000	5000	5000	5000	5000	5000	5000
	L	2080	10660	9173	11493	4094	4094	810	148	966
	H	4196	12776	11289	13609	7020	6210	2925	2264	3082
	A	2005	10585	9098	11418	4829	4018	734	73	890
	R	918	918	918	918	918	918	918	918	918
	F1	2923	11503	10016	12336	5747	4937	1652	991	1809
	F2	1863	9514	9120	11631	5435	5047	1712	973	1809
	F3	-	19800	7500	15000	a	5000	1728	863	1809
	P	16401	17238	21315	9539	7289	1193	200	1779	-
20 Other Johnstone Strait	S	1200	1200	1200	1200	1200	1200	1200	1200	1200
	L	5949	1165	2304	4712	1228	1717	945	2938	6319
	H	8949	4166	5305	7713	4229	4718	3946	5939	9320
	A	5609	826	1964	4373	889	1377	605	2599	5980
	R	1610	1610	1610	1610	1610	1610	1610	1610	1610
	F1	7219	2436	3574	5983	2499	2988	2216	4209	7590
	F2	8970	3190	4285	6654	2747	3110	2125	4025	7590
	F3	-	2100	-	14100	28000	1600	1259	2986	7590
	P	1965	4737	4705	1567	2991	808	4156	7582	-

Table 7 (cont'd)

Management Unit	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
ALL	S	10200	10200	10200	10200	10200	10200	10200	10200	10200
	L	12183	15953	15415	29310	12854	9893	3473	3339	14095
	H	21570	25339	24801	38696	22240	19279	12859	12725	23482
	A	11608	15378	14840	28735	12279	9317	2897	2764	13520
	R	4366	4366	4366	4366	4366	4366	4366	4366	4366
	F1	15974	19743	19205	33100	16645	13683	7263	7129	17886
	F2	16079	17993	18281	33657	16757	14118	7110	6631	17886
	F3	-	28000	9000	32100	11600	5098	5005	17886	
	P	25333	30335	45422	21847	16550	4202	4583	17764	-

[a]Included with Other Johnstone Strait.

Table 8. Herring forecast data (tons) for management units in the Gulf of Georgia Division, 1973-81 (see Table 1 for data codes).

Management Unit	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
21 Powell River	S	10000	10000	10000	10000	10000	10000	10000	10000	10000
	L	10049	15456	7134	12867	19840	29202	20849	29812	6597
	H	17010	22416	14095	19828	26800	36162	27809	36773	13557
	A	7593	13000	4678	10411	17384	26746	18393	27356	4141
	R	5538	5538	5538	5538	5538	5538	5538	5538	5538
	F1	13131	18538	10217	15949	22922	32284	23931	32894	9679
	F2	12257	18349	8981	15261	22263	33730	24379	33766	9679
	F3	-	12000	a	a	a	20000	18191	23814	9679
	P	17357	8439	15428	22130	36769	22448	48962	5840	-
22 Nanaimo-Comox	S	30000	30000	30000	30000	30000	30000	30000	30000	30000
	L	11350	22267	41974	41087	70730	49610	66708	50583	54588
	H	44835	55752	75459	74572	104215	83095	100193	84068	88073
	A	4017	14935	34642	33754	63398	42277	59376	43250	47255
	R	23456	23456	23456	23456	23456	23456	23456	23456	23456
	F1	27473	38391	58098	57210	86854	65733	82832	66706	70711
	F2	18045	28970	62888	61561	91066	68932	85099	66938	70711
	F3	-	25500	33000	30000	50000	55000	65810	60000	70711
	P	24183	80582	51734	89250	66490	90750	80420	63599	-
23 Yellow Point	S	10000	10000	10000	10000	10000	10000	10000	10000	10000
	L	1117	3909	43079	5939	12100	9588	9264	7845	7539
	H	15585	18377	57547	20407	26568	24056	23732	22313	22006
	A	282	3074	42244	5104	11265	8753	8429	7010	6704
	R	6116	6116	6116	6116	6116	6116	6116	6116	6116
	F1	6399	9190	48360	11220	17381	14869	14545	13127	12820
	F2	798	4333	51278	13363	19224	16476	15509	13457	12820
	F3	-	4500	a	a	a	5000	21413	10269	12820
	P	4411	39353	7327	15053	11971	10740	10547	8635	-

Table 8 (cont'd)

Management Unit	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
24 Ganges-Plumper	S	3000	3000	3000	3000	3000	3000	3000	3000	3000
	L	3085	3853	9724	17063	1144	648	1016	1013	684
	H	15335	16103	21973	29313	13394	12898	13266	13262	12933
	A	2834	3602	9473	16812	893	397	765	762	433
	R	4330	4330	4330	4330	4330	4330	4330	4330	4330
	F1	7164	7932	13802	21142	5223	4727	5095	5091	4762
	F2	5571	6594	17715	26749	7926	6435	6127	5558	4762
	F3	-	6500	16000	20000	7000	3500	4060	4697	4762
	P	6739	23066	24419	1976	1425	1771	742	852	-
25 Area 29	S	1500	1500	1500	1500	1500	1500	1500	-	-
	L	1449	450	1526	7869	1568	842	144	-	-
	H	6259	5259	6336	12679	6378	5652	4954	-	-
	A	1398	399	1476	7819	1518	791	94	-	-
	R	1552	1552	1552	1552	1552	1552	1552	-	-
	F1	2951	1951	3028	9371	3070	2344	1646	-	-
	F2	3868	2149	3098	9979	3525	2572	1646	-	-
	F3	-	-	a	a	a	a	a	-	-
	P	615	2564	6067	3139	1068	120	-	663	-
26 Other Gulf Mainland	S	300	300	300	300	300	300	300	-	300
	L	432	276	288	222	244	268	10	-	1219
	H	2088	1932	1945	1878	1900	1924	1666	-	2875
	A	423	267	280	214	235	260	2	-	1211
	R	450	450	450	450	450	450	450	-	450
	F1	873	717	730	663	685	710	452	-	1661
	F2	1657	1106	961	788	719	706	379	-	1661
	F3	-	4600	a	a	a	a	a	-	1661
	P	346	497	573	589	370	3	-	1368	-

Table 8 (cont'd

Management Unit	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
27 Other Gulf Vancouver Island	S	800	800	800	800	800	800	800	800	800
	L	1832	196	129	2519	731	360	2163	726	885
	H	3379	1742	1676	4066	2278	1907	3710	2273	2432
	A	1756	119	53	2443	655	284	2087	650	809
	R	676	676	676	676	676	676	676	676	676
	F1	2432	795	729	3118	1330	960	2763	1326	1485
	F2	3141	990	709	3458	1460	988	2949	1375	1485
	F3	-	-	45000	50000	30000	7000	2404	1122	1485
	P	259	109	2599	1342	883	2380	886	930	-
ALL	S	55600	55600	55600	55600	55600	55600	55600	53800	54100
	L	29314	46406	103856	87566	106357	90518	100155	89980	71511
	H	104490	121582	179031	162742	181533	165693	175330	158689	141877
	A	18305	35397	92846	76557	95348	79509	89145	79029	60552
	R	42118	42118	42118	42118	42118	42118	42118	40116	40565
	F1	60422	77514	134964	118674	137466	121626	131263	119144	101117
	F2	45339	62490	145630	131160	146183	129839	136089	121094	101117
	F3	-	53100	88000	100000	87000	90500	111879	99902	101118
	P	53910	154609	108147	133479	118977	128212	141557	81887	-

[a]Included with Other Gulf Vancouver Island.

Table 9. Herring forecast data (tons) for management units in the West Coast of Vancouver Island Division, 1973-81 (see Table 1 for data codes).

Management Unit	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
29 West Barkley	S	15000	15000	15000	15000	15000	15000	15000	15000	15000
	L	11346	7405	18050	9694	10501	16340	4212	6485	7591
	H	20610	16668	27313	18957	19764	25604	13476	15749	16854
	A	10131	6190	16835	8479	9286	15126	2997	5271	6376
	R	5307	5307	5307	5307	5307	5307	5307	5307	5307
	F1	15438	11497	22142	13786	14593	20433	8304	10578	11683
	F2	18145	13339	26191	17466	16838	22185	8999	10705	11683
	F3	-	18000	26000	25000	27000	35000	8192	13712	11683
	P	17433	27673	20056	32087	38740	14434	17283	10033	-
28 Other Area 23	S	1000	1000	-	1000	1000	1000	1000	1000	-
	L	14	37	-	916	10295	1395	1287	157	-
	H	749	771	-	1651	11030	2129	2021	892	-
	A	2	24	-	904	10282	1382	1274	144	-
	R	388	388	-	388	388	388	388	388	-
	F1	390	412	-	1292	10670	1770	1662	532	-
	F2	402	308	-	1316	11054	1816	1721	532	-
	F3	-	a	-	d	d	d	d	530	532
	P	185	-	1272	16173	2141	1666	236	-	-
30 South Clayoquot	S	20000	20000	20000	20000	20000	20000	20000	20000	20000
	L	26770	2839	34428	35750	37574	26242	26023	15145	22576
	H	40452	16521	48109	49432	51256	39924	39705	28827	36258
	A	25129	1198	32786	34109	35932	24600	24381	13503	20934
	R	7190	7190	7190	7190	7190	7190	7190	7190	7190
	F1	32319	8388	39976	41299	43122	31791	31571	20694	28124
	F2	32466	5492	41481	45498	45649	32849	31975	20486	28124
	F3	-	8500	25000	50000	35000	30000	28263	26696	28124
	P	2769	44043	50999	59858	48719	42145	23363	33375	-

Table 9 (cont'd)

Management Unit	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
31 Other Area 24	S	2000	2000	2000	2000	2000	2000	2000	2000	2000
	L	1025	285	1199	6322	1695	723	5382	2330	2465
	H	3824	3085	3998	9121	4494	3522	8181	5129	5265
	A	760	21	934	6057	1430	459	5118	2065	2201
	R	1335	1335	1335	1335	1335	1335	1335	1335	1335
	F1	2095	1356	2269	7392	2765	1793	6452	3400	3536
	F2	1224	845	1876	7993	2922	1754	6775	3479	3536
	F3	-	b	d	10000	4000	4000	4459	1866	3536
	P	10452	2306	19054	17733	4719	5356	3475	3354	-
32 Nootka Sound	S	6000	6000	6000	6000	6000	6000	6000	6000	-
	L	864	3830	8179	7741	2131	372	257	31992	-
	H	7686	10652	15002	14563	8953	7195	7080	38814	-
	A	607	3573	7922	7484	1874	115	0	31735	-
	R	2926	2926	2926	2926	2926	2926	2926	2926	-
	F1	3533	6499	10848	10410	4800	3042	2926	34661	-
	F2	2431	5551	11425	11516	5026	2763	2385	34661	-
	F3	-	c	18000	20000	16000	6000	2346	14386	-
	P	15226	23134	15389	2564	919	717	46836	-	-
33 Nuchatlitz Inlet	S	10000	10000	10000	10000	10000	10000	10000	10000	10000
	L	10821	6399	3427	18426	4725	13460	16651	10987	12448
	H	26063	15907	12934	27934	14232	22967	26158	20494	21955
	A	15242	5086	2114	17113	3411	12146	15337	9674	11135
	R	4798	4798	4798	4798	4798	4798	4798	4798	4798
	F1	16555	9884	6911	21911	8209	16944	20135	14471	15932
	F2	20459	8449	4669	23580	8006	16936	20977	14537	15932
	F3	-	28000	d	20000	18000	8000	17347	16728	15932
	P	8574	3173	25832	10560	20937	24134	15865	15027	-

Table 9 (cont'd)

Management Unit	Code	1973	1974	1975	1976	1977	1978	1979	1980	1981
34 Quatsino Sound	S	3000	3000	3000	3000	3000	3000	3000	3000	3000
	L	66	1328	40	6647	379	770	11628	14875	32906
	H	14248	15510	14223	20829	14562	14952	25810	29057	47089
	A	25	1288	0	6606	339	729	11588	14834	32866
	R	4533	4533	4533	4533	4533	4533	4533	4533	4533
	F1	4559	5821	4533	11140	4872	5263	16121	19368	37399
	F2	41	1543	89	8557	1391	1668	13768	16870	37399
	F3	-	2000	[d]	[d]	[d]	[d]	10367	9120	37399
	P	2330	580	7084	519	1028	13925	18123	35339	-
35 Other Up. West Coast	S	1000	1000	1000	1000	1000	1000	1000	-	-
	L	5742	3173	1626	1457	747	243	228	-	-
	H	6843	4274	2727	2558	1848	1343	1328	-	-
	A	5713	3143	1596	1427	717	213	198	-	-
	R	547	547	547	547	547	547	547	-	-
	F1	6259	3690	2143	1974	1264	760	745	-	-
	F2	7660	4215	2432	2300	1446	826	745	-	-
	F3	-	4000	40000	30000	20000	16000	1690	-	-
	P	5656	1525	1511	967	404	234	-	-	-
ALL	S	58000	58000	57000	58000	58000	58000	58000	57000	50000
	L	62382	25296	66949	86953	68046	59545	65667	81971	77986
	H	120475	83388	124306	145046	126138	117637	123759	138963	127421
	A	57608	20522	62187	82179	63272	54770	60893	77226	73511
	R	27024	27024	26637	27024	27024	27024	27024	26478	23164
	F1	84632	47546	88824	109204	90296	81795	87917	103704	96675
	F2	82830	39743	88161	118226	92331	80797	87344	101271	96675
	F3	-	60500	109000	155000	120000	99000	72664	83037	97206
	P	62625	102434	141198	140461	117607	102611	125181	97127	-

[a]Included with West Barkley.
[b]Included with South Clayoquot.
[c]Included with Nuchatlitz Inlet.
[d]Included with Other Upper West Coast.